SP-POS88Ⅳ

Line Thermal Printer

User's Manual

Beijing Spirit Technology Development Co, Ltd.

Content

Introduction 3
Chapter 1 Feature and Performance 4
1.1 Print Performance 4
1.2 Print Paper 4
1.3 Print Font 4
1.4 Interface 4
1.5 Print control commands 5
1.6 Power Supply 5
1.7 Operation Environment 5
1.8 Outline Dimension 5
1.9 Model classification 5
Chapter 2 Operation Specification 6
2.1 Printer Appearance 6
2.2 Paper Installation 6
2.2.1 Paper Loading 6
2.2.2 Solution to Paper Jam 7
2.3 Interface 7
2.3.1 Serial Interface 7
2.3.2 Parallel Interface 8
2.3.3 Cash Drawer Interface 11
2.3.4 Power Connection 11
2.4 Buttons and Indicators 11
2.5 Self-test 12
2.6 Printer Setting 12
Chapter 3 Command List 14
Appendix Index of Print Characters 17

Introduction

SP-POS88Ⅳ printer is a new type line thermal printer, it features in fast speed print, low print noise, high reliability, perfect print quality and ribbon needless, avoiding the vexation of regular maintenance.

SP-POS88Ⅳ printer: small in outline dimension, simple operation, and extensive application, especially suitable for commercial cash register, PC-POS, bank POS and all kinds of receipts print.

Chapter 1 Feature and Performance

1.1 Print Performance

- Print method: direct thermal
- Print paper width: 79.5±0.5mm
- Print density: 8 dots/mm, 576 dots/line
- Print speed: approx.250mm / sec.
- Reliability
  Print head life: 100km
  Using condition:
  * Print 12 × 24 ASCII characters, print 50 lines each time, intermittent print repeatedly
  * Each dot-line printing at the same time should not exceed 25%, each character line and one dot vertical printing repeatedly should not exceed 11 times
  * Use specified thermal paper
  Cutter life: 500,000 cuts
  Using condition: less than 30 cuts/minute
- Valid print width: 72mm
- Feeding speed: approx.250mm / sec.

1.2 Print Paper

- Thermal paper roll model: TF50KS－E（Japan paper co.ltd）
  AF50KS-E (JUJO THERMAL)
- Thermal paper roll: Width－－－ 79.5±0.5mm
  Outer Diameter －－－ 80mm（max.）
  Inner Diameter－－－ 13mm（min.）
  Thickness －－－ 53～60g / m^2

1.3 Print Font

- IBM Character set II (ANK):
  12×24 dots，1.25（W）×3.00（H）mm;
- GB GB2312-80(Chinese):
  24×24 dots，3.00（W）×3.00（H）mm.

1.4 Interface

● Serial interface

DB-25 socket (female), supports XON/XOFF and RTS/CTS protocols.
Baud rate: 12000～115200bps adjustable.
Data structure: 1start bit + (7 or 8) data bits + 1 stop bit.
Parity checking: no parity or odd, even parity optional.

● Parallel interface

DB-25 socket (male) or 36-pin is optional, 8-bit parallel interface, BUSY/ACK handshaking protocol, TTL signal level.

● Cash drawer control

DC24V，1A，6-pin RJ-11 socket.

1.5 Print control commands

● Character print commands: support double-width, double height print of ANK characters, user-defined characters and Chinese characters, the character line spacing is adjustable.

● Graphics print commands: support the print of bit-map graphics and download bit-map graphics with different density

● GS bar code print commands: support UPC-A，UPC-C，EAN-13，EAN-8，CODE39，ITF，CODEBAR，CODE93，CODE128 bar code print.

1.6 Power Supply

● DC24V±10％，2A，A-1009-3P power socket.

1.7 Operation Environment

● Operation temperature: 5～50℃; Relative humidity: 10～80％

● Storage temperature: -20～60℃; Relative humidity: 10～90℃

1.8 Outline Dimension

● 150（W）×192（L）×150（H）mm

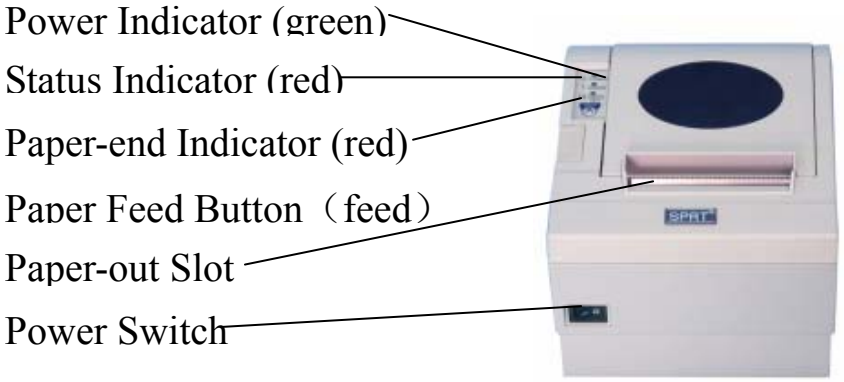
1.9 Model classification

Model	Cutter	Interface
SP-POS88Ⅳ-AS	Partial-cutting	Serial(DB25 female)
SP-POS88Ⅳ-AP1	Partial -cutting	Parallel(36-pin standard print)
SP-POS88Ⅳ-AP2	Partial -cutting	Parallel(DB25 male)

SP-POS88Ⅳ-AU	Partial -cutting	USB
SP-POS88Ⅳ-AE	Partial -cutting	Ethernet

Chapter 2 Operation Specification

2.1 Printer Appearance



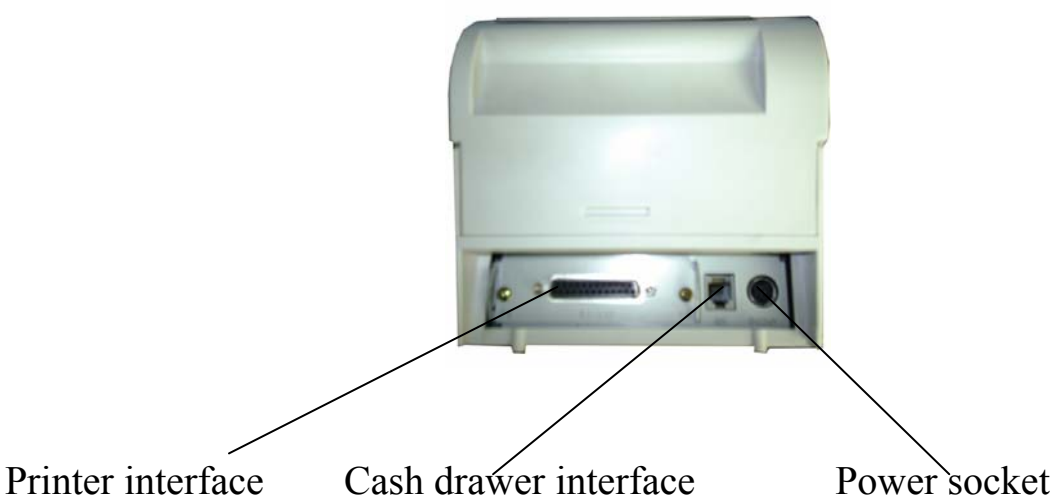


Fig.2-1 printer appearance

2.2 Paper Installation

2.2.1 Paper Loading

SP-POS88Ⅳ adopts 80mm width thermal paper roll.
If you prepare to load the paper, you can do as the following steps.
Hold down the upper cover button, open the movable upper cover, move away the old paper roll, and put the new thermal paper in the paper holder of printer, draw a certain length of the paper roll, put the paper end on the

print head, close the upper cover and press it downwards lightly until it restore to original position, and the paper end appears from the paper-out slot which is on the upper cover, then print paper installation is finished.

Caution!
1. When there is no paper in the print head, don't press 【FEED】 button, avoiding to shorten the print head life;
2. Please don't feed or draw the paper forwards or backwards with hands. When returning paper, please cut the extra paper, and press 【LF】button, paper will go forwards.

2.2.2 Solution to Paper Jam

Turn power off, open the upper cover, hold down the black rubber cutter lever, at the same time move the cutter forwards slowly, can separate the cutter from the print head. Then lift the print head lever forwards to maximum position, draw out the paper slowly with hand.

2.3 Interface

2.3.1 Serial Interface

The serial interface of SP-POS88Ⅳ printer is compatible with RS-232C, supports RTS/CTS and XON/XOFF handshaking protocols, uses DB25 socket (female). The pin order of the serial port is as Fig.2-2 shows:

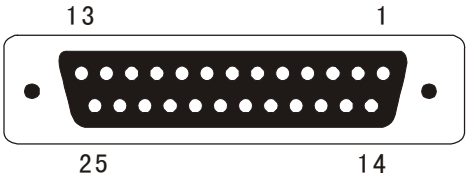


Fig.2-2 Pin Order of Serial Port

The pin assignment of serial interface is shown in Fig. 2-3:

Pin No.	Signal Name	Source	Description
2	RXD	Host	Printer receives data from host
3	TXD	Printer	Printer transmits control code X-ON/X-OFF and data to host
5	CTS	Printer	Signal "MARK" indicates that the printer is "BUSY" and unable to receive data; "SPACE" indicates that the printer is "READY" for receiving data.

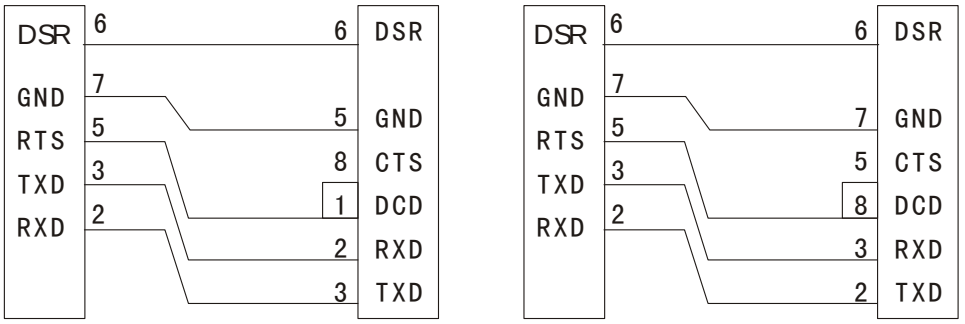
6	DSR	Printer	Signal “SPACE” indicates that the printer is “ONLINE”
7	GND	—	Signal Ground
8	DCD	Printer	Same to signal CTS

Note: ①“Source” denotes the source that signal come from;
② Logical signal level is EIA.

Fig.2-3 Pin Assignment of Serial Interface

The baud rate and data structure in serial interface mode is 9600bps, 8-bit data bits, no parity bit and 1 stop bit.

The serial interface of SP-POS88Ⅳ can be connected to standard RS-232CRS-232C interface. When it is connected to IBM PC or its compatible machine, connection can accord to Fig.2-4.



Printer 25PIN Socket — IBM PC Serial Interface DB-9

Printer 25PIN Socket — IBM PC Serial Interface DB-25

Fig.2-4 Connection between SP-POS88Ⅳ and IBM PC Serial Interface Sketch Map

2.3.2 Parallel Interface

The parallel interface of SP-POS88 Ⅳ printer is compatible with CENTRONICS, supports BUSY or ACK handshaking protocol, uses DB25 socket (male) or 36pin CENIRONICS socket (female) optional.
The pin order of parallel port is as Fig. 2-5 shows:

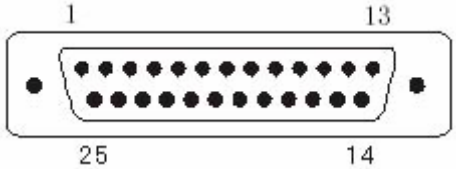


Fig.2-5 Pin Order of Parallel Port

The pin assignment of DB25 parallel interface is shown in Fig. 2-6 shows:

Pin No.	Signal	Direction	Description

1	/STB	In	Strobe pulse to latch data, Reading occurs at falling edge.
2 3 4 5 6 7 8 9	DATA1 DATA2 DATA3 DATA4 DATA5 DATA6 DATA7 DATA8	In In In In In In In In	These signals represent the 1st bit to 8th bit of the parallel data representatively, each signal is at HIGH level when data is logic 1, and LOW when data is logic 0.
10	/ACK	Out	Answer pulse, LOW level signal indicates that data have already been received and the printer gets ready to receive the next data.
11	BUSY	Out	HIGH level signal indicates that the printer is BUSY and can not receive data.
12	PE	Out	HIGH level signal indicates that paper is end.
13	SEL	Out	Pulling up to HIGH level signal by a resistor
15	/ERR	Out	LOW level signal indicates that there has error.
14,16,17	NC	---	No connection
18-25	GND	---	Grounding logical 0 level

Note: （1）“In” denotes input to the printer，“Out” denotes output from the printer.

（2）Signal level is TTL standard.

Fig.2-6 Pin assignment of DB-25 parallel interface

The pin assignment of 36pin parallel interface is as Fig.2-7 shows:

pin No.	Signal	Direction	Description

1	/STB	In	Strobe pulse to latch data, Reading occurs at falling edge.
2 3 4 5 6 7 8 9	DATA1 DATA2 DATA3 DATA4 DATA5 DATA6 DATA7 DATA8	In In In In In In In In	These signals represent the 1st bit to 8th bit of the parallel data representatively, each signal is at HIGH level when data is logic 1, and LOW when data is logic 0.
10	/ACK	Out	Answer pulse, LOW level signal indicates that data have already been received and the printer gets ready to receive the next data.
11	BUSY	Out	HIGH level signal indicates that the printer is BUSY and can not receive data.
12	PE	Out	HIGH level signal indicates that paper running out.
13	SEL	Out	Pulling up to HIGH level signal by a resistor
32	/ERR	Out	LOW level signal indicates that there has error.
14, 15, 17, 18, 34, 36	NC	---	No connection
16, 19～ 30, 33	GND	---	Grounding logical 0 level

Note: （1）“In” denotes input to the printer，“Out” denotes output from the printer.

（2）Signal level is TTL standard.

Fig. 2-7 Pin assignment of 36pin parallel interface

The timing chart for interface signal of parallel interface is as Fig.2-8 shows:

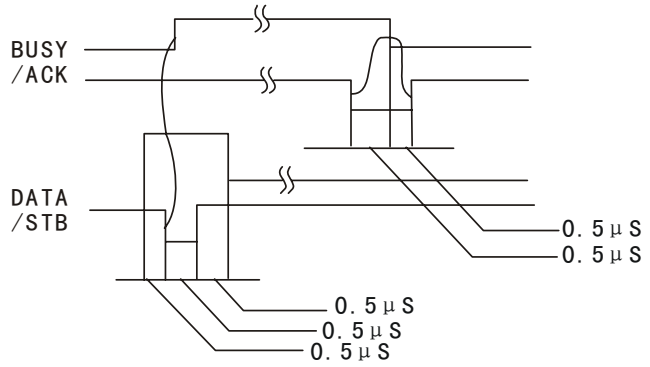


Fig.2-8 Signal Timing Chart of Parallel Interface

2.3.3 Cash Drawer Interface

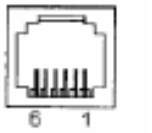


Fig. 2-9
Cash drawer interface

The cash drawer interface of POS-POS88Ⅳ adopts RJ-11 6-pin socket, as Fig.2-9 shows:

The pin assignment of the cash drawer interface is defined as follows:

Pin No.	Signal	Direction
1	Chassis Ground	---
2	Cash drawer driver signal	Out
3	Cash drawer on/off status signal	In
4	+24VDC	Out
5	N.C	---
6	Cash drawer on/off status signal ground	---

2.3.4 Power Connection

Fig.2-10
Power Socket

SP-POS88Ⅳ uses the external power supply adopter as 24V±10%、2A, power socket is A-1009-3P model, as Fig. 2-10 shows:

2.4 Buttons and Indicators

There is one button and three indicators on SP-POS88Ⅳ printer.【FEED】is paper feeding button, the function of its enabling or disabling the button on/off can be set by print command, when the button is enabled, press 【FEED】 button, then the paper presenting driver starts up and paper fed into the printer; release【FEED】 button, paper feeding stops. The green

POWER light is the power indicator, red ERROR light is status indicator, it is dark when the printer works normally, while it flashes when reporting an abnormal emergency, as the following form shows:

Error	Indicator Status	Description	ERROR Code (HEX)
Paper out	Indicator blinks		
Print head uplift	Buzzer rings	Put down print head	
Print head overheat	Buzzer rings and indicator blinks	Recovers automatically when the print head cools.	
Auto cutter Position Error	Buzzer rings and indicator blinks	Impossible to recover, check if there is paper jam.	

When any error shown above occurs, different status and data will be returned according to different printing commands.

2.5 Self-test

The self-test will check the condition of printer, if the printer prints out the self-test receipt correctly, it means the printer works normally. Otherwise it needs to repair.
The self-test will print out the firmware version, interface setting and 128 ANK characters.
Hold down【FEED】button and turn on the power, then release the button, self-test begins automatically at this moment.

2.6 Printer Setting

User can use the Setting Tool to set the serial interface, printing density etc. parameters, also can use the following commands to set:
1B 09 Set to start
1B 10 n1 n2
1B 15 Set to stop
The data of n1, n2 will be returned by serial interface.
n1 is used to set the baud rate and data format, the details for setting please refer to the following:
n1 indicates:

Serial Interface:

Bit	Function	ON	OFF
1－1	Data reception error	Ignored	Print “？ ”
1－2	Receive buffer capacity	45 bytes	4K bytes
1－3	Handshaking	XON/XOFF	DTR/DSR
1－4	Word length	7 bits	8 bits
1－5	Parity check	Enabled	Disabled
1－6	Parity selection	Even	Odd
1－7 1－8	Transmission speed (refer to the following table)		

Transmission speed（bps）	1－7	1－8
38400	ON	ON
4800	OFF	ON
9600	ON	OFF
19200	OFF	OFF

n2 indicates:

Bit	Function	ON	OFF
2－1	Handshaking (BUSY condition)	Receive buffer full	Off line or receive buffer full
2－2	Reserved (Do not change settings)		
2－3 2－4	Print density / Low power consumption	Refer to Table A	
2－5	Change receive buffer BUSY condition (If data buffer capacity set to 4KB.)	When the remaining receive buffer capacity is 138 bytes, change BUSY condition.	When the remaining receive buffer capacity is 256 bytes, change BUSY condition.
2－6	Reserved (Do not change settings)		
2－7			
2－8	0D print	Enabled	Disabled

Parallel Interface

Bit	Function	ON	OFF
1－1	Go along automatically	Enabled	Disabled
1－2	Receive buffer capacity	45 bytes	4K bytes

1-3~1-8	Undefined

Bit	Function	ON	OFF
2－1	Handshaking (BUSY condition)	Receive buffer full	Off line or receive buffer full
2－2	Reserved (Do not change settings)		
2－3 2－4	Print density / Low power consumption	Refer to Table A	
2－5	Change receive buffer BUSY condition (If data buffer capacity set to 4KB.)	When the remaining receive buffer capacity is 138 bytes, change BUSY condition.	When the remaining receive buffer capacity is 256 bytes, change BUSY condition.
2－6～ 2－7	Reserved (Do not change settings)		
2－8	On, 0x0d enabled		

Table A

Print density / Low power consumption	SW 2-3	SW 2-4
- Low power consumption mode	ON	ON
1 Normal density	OFF	OFF
2 Medium density	ON	OFF
3 High density	OFF	ON

Chapter 3 Command List

Command	Name
HT	Horizontal tab
LF	Print and line feed
FF	Print and return to standard mode (in page mode)
CR	Print and carriage return
CAN	Cancel print data in page mode
DLE EOT	Real-time status transmission
DLE ENQ	Real-time request to printer
DLE DC4	Generate pulse at real-time
ESC FF	Print data in page mode
ESC SP	Set right-side character spacing

ESC !	Select print mode(s)
ESC $	Set absolute print position
ESC %	Select/cancel user-defined character set
ESC &	Define user-defined characters
ESC *	Select bit-image mode
ESC -	Turn underline mode on/off
ESC 2	Select default line spacing
ESC 3	Set line spacing
ESC =	Select peripheral device
ESC ?	Cancel user-defined characters
ESC @	Initialize printer
ESC D	Set horizontal tab positions
ESC E	Turn emphasized mode on/off
ESC G	Turn double-strike mode on/off
ESC J	Print and feed paper
ESC L	Select page mode
ESC M	Select character font
ESC S	Select standard mode
ESC T	Select print direction in page mode
ESC V	Turn 90° clockwise rotation mode on/off
ESC W	Set printing area in page mode
**ESC **	Set relative print position
ESC a	Select justification
ESC c 0	Select paper type
ESC c 3	Select paper sensor(s) to output paper-end signals
ESC c 4	Select paper sensor(s) to stop printing
ESC c 5	Enable/disable panel buttons
ESC d	Print and feed **n** lines
ESC p	General pulse
ESC t	Select character code table
ESC {	Turn upside-down printing mode on/off
FS g 1	Write to user NV memory
FS g 2	Read from user NV memory
FS p	Print NV bit image
FS q	Define NV bit image
GS FF	Black mark paper localization
GS !	Select character size
GS $	Set absolute vertical print position in page mode
GS *	Define downloaded bit image
GS (	Execute test print

GS /	Print downloaded bit image
GS :	Start/end macro definition
GS B	Turn white/black reverse printing mode on/off
GS H	Select printing position of HRI characters
GS I	Transmit printer ID
GS L	Set left margin
GS P	Set horizontal and vertical motion units
GS V	Cut paper
GS W	Set printing area width
**GS **	Set relative vertical print position in page mode Ignored
GS ^	Execute macro
GS a	Enable/disable Automatic Status Back (ASB)
GS b	Turn smoothing mode on/off
GS f	Select font for HRI characters
GS h	Set bar code height
GS k	Print bar code
GS r	Transmit status
GS v 0	Print raster bit image
GS w	Set bar code width
FS !	Set print mode(s) for Chinese characters
FS &	Select Chinese character mode
FS –	Turn underline mode on/off for Chinese characters
FS .	Cancel Chinese character mode
FS 2	Define user-defined Chinese characters
FS S	Set left- and right-side Chinese character spacing
FS W	Turn quadruple-size mode on/off for Chinese characters

Detailed command description please refer to 《SP-POS88IV Control Commands》.

Appendix Index of Print Characters